

What is Claimed:

1. A method of fabricating a semiconductor substrate for a compound semiconductor device, comprising:

- (a) providing a baseplate of a substance that permits epitaxial growth of compound semiconductors thereon;
- (b) creating a buffer region by causing a first compound semiconductor to grow epitaxially on the baseplate, the buffer region possibly containing dislocations;
- (c) creating a dislocation refracting region on a major surface of the buffer region by causing a second compound semiconductor, different from the first compound semiconductor, to grow epitaxially on the major surface of the buffer region, the dislocation refracting region having a major surface with a multiplicity of protuberances capable of refracting extensions of the dislocations from the buffer region; and
- (d) creating a leveling region on the major surface of the dislocation refracting region by causing a third compound semiconductor, different from the second compound semiconductor, to grow epitaxially on the major surface of the dislocation refracting region, the leveling region having a major surface of greater levelness than the major surface of the dislocation refracting region;
- (e) whereby the leveling region is less in dislocation density than the buffer region and the dislocation refracting region as the dislocations created in the buffer region are refracted away from the leveling region by the protuberances on the major surface of the dislocation refracting region.

2. The method of claim 1 wherein the second compound semiconductor for the dislocation refracting region is an indium-containing nitride.

3. The method of claim 1 wherein the dislocation refracting region is formed by:

- (a) creating a first layer on the major surface of the buffer region by causing a first nitride to grow epitaxially thereon, the first nitride containing indium in a first proportion;
- (b) creating a second layer on the first layer by causing a second nitride to grow epitaxially thereon, the second nitride containing indium in a second proportion that is greater than the first proportion; and

- (c) repeating the steps (a) and (b) a prescribed number of times.
4. A semiconductor substrate for a compound semiconductor device comprising:
- (a) a baseplate ;
 - (b) a buffer region of a first compound semiconductor formed on the baseplate, the buffer region possibly containing dislocations;
 - (c) a dislocation refracting region of a second compound semiconductor, different from the first compound semiconductor, formed on a major surface of the buffer region, the dislocation refracting region having a major surface with a multiplicity of protuberances capable of refracting extensions of the dislocations from the buffer region; and
 - (d) a leveling region of a third compound semiconductor, different from the second compound semiconductor, formed on the major surface of the dislocation refracting region, the leveling region having a major surface of greater levelness than the major surface of the dislocation refracting region;
 - (e) whereby the leveling region is less in dislocation density than the buffer region and the dislocation refracting region as the dislocations created in the buffer region are refracted away from the leveling region by the protuberances on the major surface of the dislocation refracting region.
5. The semiconductor substrate of claim 4 wherein the baseplate is of a substance that permits epitaxial growth of compound semiconductors.
6. The semiconductor substrate of claim 5 wherein the baseplate is of an electroconductive silicon or silicon compound containing conductivity-determinant impurities.
7. The semiconductor substrate of claim 4 wherein the buffer region is of an aluminum-containing, indium-free nitride.
8. The semiconductor substrate of claim 4 wherein the buffer region is a lamination of a first layer of an aluminum-containing, indium-free nitride overlying the baseplate, and a second layer of a gallium-containing, indium-free nitride overlying the first layer.
9. The semiconductor substrate of claim 4 wherein the buffer region is an alternating

lamination of a plurality of first layers of an aluminum-containing, indium-free nitride and a plurality of second layers of a gallium-containing, indium-free nitride.

10. The semiconductor substrate of claim 4 wherein the buffer region comprises a first buffer subregion overlying the baseplate, and a second buffer subregion overlying the first buffer subregion, wherein the first buffer subregion is an alternating lamination of a plurality of first layers of an aluminum-containing, indium-free nitride and a plurality of second layers of a gallium-containing, indium-free nitride, and wherein the second buffer subregion is of a gallium-containing, indium-free nitride.

11. The semiconductor substrate of claim 4 wherein the dislocation refracting region is of an indium-containing nitride.

12. The semiconductor substrate of claim 4 wherein the dislocation refracting region is an alternating lamination of a plurality of first layers of a nitride containing indium in a first proportion, and a plurality of second layers of a nitride containing indium in a second proportion which is greater than the first proportion.

13. The semiconductor substrate of claim 4 wherein the leveling region is of an indium-free nitride.

14. The semiconductor substrate of claim 4 wherein the leveling region is an alternating lamination of a plurality of first layers of an aluminum-containing, indium-free nitride, and a plurality of second layers of a gallium-containing, indium-free nitride.

15. A semiconductor substrate for a compound semiconductor device comprising:

- (a) a baseplate of silicon or silicon compound;
- (b) a first semiconductor region formed on a major surface of the baseplate by epitaxially growing an indium-free nitride thereon, the first semiconductor region containing dislocations;
- (c) a second semiconductor region formed on the first semiconductor region by epitaxially growing an indium-containing nitride thereon, the second semiconductor region containing dislocations; and

(d) a third semiconductor region formed on a major surface of the second semiconductor region by epitaxially growing an indium-free nitride thereon, to provide a major surface of greater levelness than the major surface of the second semiconductor region, the third semiconductor region containing dislocations at a dislocation density less than the first semiconductor region and the second semiconductor region.